

Is Time Observable?

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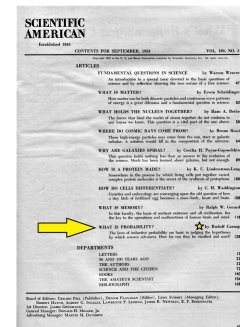
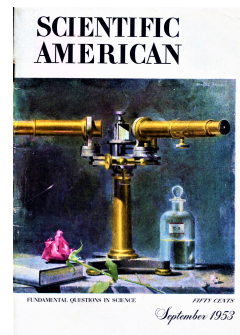
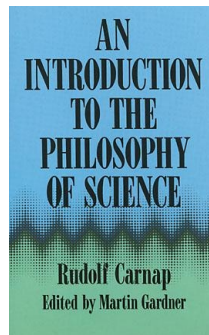
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Is time is just a number you read off a clock?

ABSTRACT:

Is **time** observable or more precisely **an** observable in the physics sense? What do we mean by observable or more specifically **an** observable? The short answer is NO. this is because time is not a parameter or observable [as it is treated in classical and quantum physics respectively] since it is a construction derived from information created by changes in the evolving systems around us.



Rudolf Carnap [above] states in the book ‘**An Introduction to the Philosophy of Science**’ that “Empirical laws are laws that can be confirmed directly by empirical observations. The term “**observable**” is often used for any phenomenon that can be directly observed, so it can be said that empirical laws are laws about observables”. He states that “To the physicist, the word [observable] has a much broader meaning. It includes any quantitative **magnitude** that can be measured in a relatively simple, direct way”. He further states that “magnitudes that can be established by relatively simple procedures [or measurement processes]---length with a ruler, **time with a clock**, or frequency of light waves with a spectrometer --- are called **observables**”.

There are many discussions about whether time is an observable in quantum mechanics. This is not the focus here. The real question is what is time and if we think we can observe it. Does time have some fundamental status in cosmology and everyday use? It is the position of this author that in fact time is NOT observable and

NOT *an observable* in either the context of physics or in common use since the fundamental nature of time is generally misunderstood as a dimension attached to space as in space-time.

Let us review what this author has proposed as the fundamental nature of time.

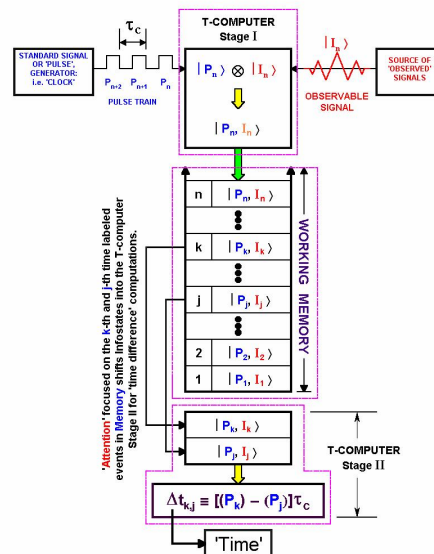
The 7 principles found to be the **actual nature of time**.

1. **Philosophy of Time:** time exists as information, NOT as a dimension. Time is as real as information is real.
2. **Arrows of Time:** Quantum Arrows of Time [QATs] and all other arrows of time only exist as constructions from signal/information flow in causal networks. All arrows of time point from cause [source] to effect [sink] from simple 2-level systems at the quantum scale such as photon emission in atoms up through the cosmological domain through hierarchical scaling of interconnected causal networks at various plateaus of complexity [POCs].
3. **Direction of Time:** only exists as directions associated with vectors representing arrows of time pointing from cause to effect [source to sink] in the causal networks of the evolving universe.
4. **There is no Time to travel 'in', only space** [i.e. the vacuum] where the 'now' created by our consciousness is all we can directly experience. Note that the vacuum exists as a physical entity and space is only a map of this fundamental basis for the universe.

"The Map is not the territory" - Alfred Korzybski
5. **Our brains T-computer** creates 'time' labeled maps of change seen in the observed patterns in the configurations of matter in the universe. The T-computer creates sequential time stamped and labeled memories representing what we perceive. **This is the 'time' we read off any clock.** This has been confirmed by recent fMRI research see **"The evolution of brain activation during temporal processing"**.

Change is a Fundamental property of the universe, time is not.

"No change, then, no time" - J. B. Priestley



See **The T-computer of the Brain** for more about this.

6. **The Problem of Time** therefore has been solved using Feynman Clocks, T-computers, and Causal Networks.
7. **The Vacuum is space and Time is a measure of change** in the configurations of matter floating on the surface of the vacuum. We attribute dimensions to the vacuum [space] as part of our application of geometry [models] to the real world. The vacuum is much more complex than mere 'empty' space. The vacuum is in fact a

multi-vacuum with properties that depend locally on matter and globally on cosmic universality. Cosmological evolution is measured by the maps of change we construct using time as a metric.

Special Note: Time is still useful as a measure of change in our daily lives. Using repeating reproducible regular signal generating systems such as standard clocks [e.g. atomic clocks, watches, computer clocks etc.] gives us a way to create our ordered time maps. Time produced by comparison of a standard clock with the observed system and processed by our brains T-computer or similar 'clocked' information processing devices is 'real'. The reality of time as a pacer of human activities is embedded in our lives. Our manufactured time is used to identify the past of our lives and define the possibilities of the future...**change does not occur *in time* but is used to create information carrying signals that we use to create time labeled memories of the world around us using our internal T-computer in conjunction with external standard 'clocks'.**

Conclusions:

Time is not a parameter related to a time dimension. Time is not observable in a fundamental sense. Time is also not an observable in the quantum mechanical sense. Time is therefore just a number you read from a clock and process with your brains T-computer.